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Full Length Research Paper

Determinants of late booking for antenatal care among pregnant women in selected hospitals in South East Nigeria

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Late booking for antenatal care is a frequent occurrence among pregnant women in Nigeria unlike in most developed countries. The objective of the study was to determine the maternal, socio-cultural, religious, and institutional/systemic factors that determine late booking for antenatal care among pregnant women in Enugu, Nigeria. Descriptive, cross-sectional questionnaire based method was employed in the study. A proportionate stratified sampling technique was used to select 282 pregnant women from three selected hospitals for the study. A validated structured questionnaire constructed by the researchers was used for collection of data. Findings were analysed using both descriptive and inferential statistics. Respondents revealed that maternal factors such as health status in present pregnancy [205(70.7%)], ignorance of proper gestational age to register for antenatal [125(43.1%)] and experience from previous pregnancies [101(34.8%)] determine timing of booking among pregnant women. Socio-cultural factors such as husband's decision [100(34.5%)] and preference for mother in-law/friends/other women's advice during the early weeks of pregnancy [88(26.9%)] determine timing of booking. Religious factor which mostly determine late booking in the study was preference for prayer and faith healing [157(54.1%)]. Institutional/systemic factors such as long waiting time in hospitals [142(49.0%)] and very frequent antenatal care schedule [129(44.5%)] determine late booking for antenatal care among pregnant women. Health status in present pregnancy, husband's decision, long waiting time at the clinic and frequent number of ante-natal visits are the major determinants of late booking in Enugu. There is need for transitioning from traditional approach of ANC to Focused Antenatal Care (FANC) model recommended by WHO.

Key words: Determinants, Enugu, late ante natal booking.

INTRODUCTION

Each year, approximately one third of a million women worldwide die due to pregnancy related conditions; 99% of these deaths occur in developing countries of Africa and Asia and approximately three quarter of them are

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considered avoidable (WHO, 2014). Preventing problems for mothers and babies depends on an operational continuum of care with accessible high quality care before and during pregnancy, childbirth and the postnatal period, and this also depends on the support available to help pregnant women reach services particularly when complications occur (Lancetto et al., 2010).

An important element of this continuum of care worthy to mention is effective antenatal care. Antenatal care (ANC) can be defined as the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and baby during pregnancy (WHO, 2016). The components of ANC according to WHO include: Risk identification, prevention and management of pregnancy-related or concurrent diseases and health education and health promotion. Overtime, this form of care for pregnant women has become an important pillar in reducing maternal mortality rate (Onoh et al., 2013). The goal of antenatal care package is to prepare for birth and parenthood as well as prevent, detect, alleviate or manage the three types of health problems during pregnancy that affect mothers and babies: Complication of pregnancy itself, pre-existing condition that worsen during pregnancy and effects of unhealthy lifestyle (Lancetto et al., 2010). Good antenatal links the woman and her family with formal health system, increases the chance of utilizing a skilled attendant and contributes to good health through the life cycle (Onoh et al., 2013). Inadequate care during this time breaks a critical link in the continuum of care and affects both women and babies (Lancetto et al., 2010).

The first antenatal visit (booking) is a very important component of antenatal care as service providers use the occasion to collect basic medical information that will form the basis of care for the client. Wang et al. (2011) however noted that many women especially in Sub-Saharan Africa tend to wait to start antenatal care until the second or third trimester. Findings of Uganda Demographic and Health Survey (2011) showed that though over 90% pregnant women attended antenatal care at least once, only 48% made four or more antenatal care visits during their entire pregnancy; only 21% of the women made their first antenatal care visit before the fourth month of pregnancy and only 52% of women delivered under the care of skilled birth attendant; the maternal mortality ratio was 438 per 100,000 live birth.

The antenatal policy in Nigeria follows the latest WHO approach to promote safe motherhood. It is worthy to note that despite WHOs' recommendation and antenatal care policy in Nigeria, studies have shown that late booking has become a persistent pathology in the country similar to what is being reported for other developing countries of the world (Ufenne and Utoo, 2013). Ndidi and Oseremen (2010) in their study revealed that vast majority of Nigerian women who utilize modern antenatal care book late which is in sharp contrast with findings in most developed countries. The prevalence of late booking as reported by researchers were as high as 86% in south west and 79% in Niger delta area of Nigeria (Okunlola et al., 2008; Adekanle and Isawumi, 2008).

The researchers in this study through the evaluation of antenatal booking records in selected hospitals found that the prevalence of late booking in South East Nigeria was as high as 75%. The researchers wondered what could be responsible for this late booking of antenatal care and this speculation motivated them to empirically ascertain the determinants of late booking among pregnant women in some selected hospitals in Enugu metropolis. Moreover, this study has not been carried out in South East and the researchers wish to bridge this gap.

The findings from this study will provide information on the factors that determine late booking for antenatal care among pregnant women. The factors identified, especially socio-cultural and organizational/systemic factors will help the policy makers to recognize the need to design new policies and adjust existing ones so as to protect and empower pregnant women as well as improve service delivery in health care setting.

In addition, nurse administrators and managers will be encouraged to enhance nurses' attitude that may deter women from early booking through supervision, seminars, lectures and workshops. Hospital administrators through the findings of this work will provide needed help and changes that may facilitate early booking e.g prompt attention to pregnant women, and reduction in the cost of antenatal services. Finally, the information gotten will provide a solid basis for proper health education with the aim of reducing the prevalence of late booking among pregnant women and consequent high maternal mortality rate.

Objectives of the study

The aim of this study was to assess the determinants of late booking for antenatal care among pregnant women receiving care in some selected hospitals in South East, Nigeria. The specific objectives were to: Assess the maternal factors that predispose to late booking for antenatal care among pregnant women; identify the socio-cultural factors that are associated with late booking for antenatal care among pregnant women; determine the religious factors that contribute to late booking for antenatal care among pregnant women; assess organizational/systemic factors that determine late booking among pregnant women.

RESEARCH METHODOLOGY

This is a descriptive cross sectional study. The study was carried out in three hospitals in Enugu State. The antenatal clinics of ESUT Teaching Hospital, Enugu, Poly Clinic, Asata and Ntasi Obi Hospital

Trans-Ekulu were purposively selected. ESUTTH is a government owned tertiary institution, Poly clinic is a district hospital while Ntasi Obi is a missionary hospital; each located at different areas in Enugu Metropolis. A sample of 310 pregnant women from the three selected hospitals was used for the study. This was drawn from a population of 1061 pregnant women who attend ANC in the selected hospitals using power analysis. Utilizing the sample population for the study (310) and the known population of pregnant women who booked for antenatal in each of the three hospitals (1061) for a six month period, a proportionate stratified sampling method was used to obtain a sample of pregnant women from each hospital. A sample size of 123, 118 and 69 pregnant women constituting 40, 38 and 22%, respectively was obtained from ESUTH, Poly Clinic and Ntasi Obi Hospital, respectively. A researcher developed and pre-tested questionnaire containing 31 questions was used to elicit information from the respondents on their socio-demographic data and factors that determine late booking among pregnant women which include personal, socio-cultural, religious and institutional/systemic factors. Pregnant women who presented for their first ANC visit with a 16 week GA or more were included in the study. Ethical approval was gotten from the research and ethical committee of ESUTH while oral informed consent was gotten from individual respondent before data collection. Data collected was analyzed using descriptive statistics of frequency and percentage. This was done using the statistical tool of IBM statistical package for social sciences (SPSS) version 20.0.

RESULTS

Out of the 310 questionnaire distributed, only 290 were collected and duly filled.

Socio demographic data

The minimum age of the respondents was 17 years while the maximum age was 47 years; the mean age for all the respondents was 29.73 years with a standard deviation of 5.59 years. Out of the 290 respondents 282(97.2%) were married, while 8(2.7%) are single, 86(29.7%) of the respondents are self-employed while 43(14.8%) are civil servants. Most 157(53.3%) of the respondents husbands were self-employed while 72(25.4) are civil servant, 10(3.5%) of the respondents had primary school education, 139(48.1%) of the respondents had secondary education, while 59(20.4%) had OND. Majority 121(43.2%) of the respondent's husbands had secondary education, while only 38(13.6%) had OND (Table 1).

Maternal factors

Health status in present pregnancy (70.7%) and ignorance of timing of registration (43.1%) were the major maternal determinants to late booking. Other minor determinants include poor exposure from past pregnancy (34.8%), poor knowledge of need for early registration (31.4%), lack of money for registration (29.7%), and young maternal age (9.3%) (Table 2).

Socio-cultural factors

The major socio-cultural factors identified by the respondents were husbands' decision (34.5%) and preference of mother in laws (26.9%). Others include lack of adequate information (10.7%), preference for TBA (7.9%) (Table 3).

Religious factors

The respondents identified preference for prayer and faith healing (54.1%) as the religious factor in late booking. Other were engagement with religious activities (16.5%), avoidance of exposure of private parts to male staff (15.8%) and advice from religious leaders/members (14.8%) (Table 4).

System factors

Long waiting time (49%), frequent ANC follow up schedule (44.5%), attitude of nurses and other staff (23.1%), high cost of ANC (25.9%), poor communication by HCP on when to initiate ANC (24.8%) are some of the identified institutional factors that determine late booking (Table 5).

DISCUSSION

Health status in index pregnancy, exposure and knowledge from previous pregnancy, ignorance of the appropriate gestational age to register were very outstanding as maternal factors that determine late booking among the study group. This show that most women book late because of the belief that there are no advantages in booking for antenatal care in the first 4 months of the pregnancy. This may also be due to the fact that antenatal care is viewed primarily as curative among the study population rather than preventive. In this environment, it has been noticed that people visit the hospitals only when they are sick, and that is why wellness clinics do not thrive in this area. This can definitely not be different for pregnant women whose conditions are not seen as sick' but as a natural phenomenon, therefore, there should not be cause for alarm especially if the woman is healthy during this period. Ignorance of time for booking may indicate poor information from health care workers since majority are multigravidas who have attended antenatal in their previous pregnancies. Favorable outcome from previous pregnancy was identified by respondents as a determinant to late booking for ANC. It is pertinent to note that from the demographic history, majority of study respondents were multigravidas and mostly had uncomplicated pregnancy and labour. This further reveals

Table 1. Socio-demographic data of respondents (n=290).

Parameter		Frequency	Percentage
Age of respondents (Years)	Mean	29.73	
	SD	5.59	
	≤ 19	5	1.7
	20-29	150	51.7
	30-39	118	40.7
	40-49	17	5.9
Total		**290**	**100.0**
Religion	Muslim	8	2.8
	Christianity	282	97.2
Total		**290**	**100.0**
Marital status	Single	7	2.4
	Married	282	97.2
	Divorced/separated	1	0.3
Total		**290**	**100.0**
Employment status	Civil servant	43	14.8
	Private employment	48	16.6
	Self-employed	86	29.7
	Unemployed	31	10.7
	House wife	33	11.4
	Student	49	16.9
Total		**290**	**100.0**
Educational status	No formal education	1	0.3
	Primary	10	3.5
	Secondary	139	48.1
	Ordinary National diploma	59	20.4
	Higher National Diploma	40	13.8
	BSc	27	9.3
	PhD	1	0.3
	NCE	12	4.1
Total		**289**	**100.0**
Husband's educational status	Primary	9	3.2
	Secondary	121	43.2
	Ordinary National Diploma	38	13.6
	Higher National Diploma	55	19.6
	BSc	39	13.9
	MSc	15	5.4
	PhD	3	1.1
Total		**280**	**100.0**

the effect of misconception and ignorance that since they are not first timers and have not had problem in any of their previous pregnancy, they need not book early for antenatal care. This further reveals that parity and outcome of previous pregnancy are also maternal factors that influence pregnant women to book late for antenatal and are in keeping with the findings of the studies by Nwagha et al. (2008) and Kisuule et al. (2013), which revealed that parity, ignorance, absence of any problem in current pregnancy are factors that may influence pregnant women's' decision to book late for antenatal care.

Findings from the study revealed that a socio-cultural factor such as husband's decision plays a vital role in

Table 2. Maternal factors in late booking (n = 290).

Parameter	Frequency	Percentage
Health status in present pregnancy	205	70.7
Ignorance of timing of registration	125	43.1
Poor exposure from past pregnancies	101	34.8
Poor knowledge of need for early registration	91	31.4
Lack of money for registration	86	29.7
Tight job schedule	65	22.4
Far distance to the hospitals	44	15.2
Young maternal age	27	9.3

Table 3. Socio-cultural factors in late booking (n = 290).

Response	Frequency	Percentage
ANC depends on husbands decision	100	34.5
Preference of mother-in-law	88	26.9
Lack of adequate media information	47	10.7
ANC is only useful for emergencies	29	10.0
Fear of being attacked by evil powers during early pregnancy	26	8.9
Preference of Traditional birth attendants	23	7.9

Table 4. Religious factors in late booking (n = 290).

Response	Frequency	Percentage
Preference for prayer and faith healing	157	54.1
Engagement with religious activities	48	16.5
Avoidance of exposure of private parts to male staff	46	15.8
Advice from religious leaders/members	43	14.8

Table 5. System factors in late booking (n = 290).

Response	Frequency	Percentage
Long waiting time	142	49.0
Frequent ANC follow up schedule	129	44.5
High cost of ANC	75	25.9
Attitude of nurses and other staff	67	23.1
Long travelling time to health facility	53	18.3
Poor communication by health care providers on when to initiate ANC	29	10.0
Inadequate health facilities	20	6.9

exposing pregnant women to late booking for antenatal care. This may be because in the African culture decisions in the family are male dominant and women are always silent when it comes to deciding on matters that relates to their health due to the cultural inclination of our society and subordinate roles of women. This may also be attributed to the fact that most men in this study are not university graduates. It is believed that the more exposed an individual is the more informed decision they make with regards to their health and that of their family members of which their wives are included. Pregnant women also indicated they booked late due to not receiving enough information from the media. One may reason that this is so because women are too busy these days to seek for information which in turn points to the role reversal as seen in our society today; women are no

longer provided for, rather they provide and carry the load of the family and therefore, have no time for their health. In addition, it is usually taken for granted that women are aware of when to book for ante natal care, so it is not usually discussed in media rather topics like complications of pregnancy are given more emphasis. The finding also revealed preference for mother-in-law/older women's advice with reference to booking time.as one of the factors. This might also be due to the outcome of a complex interplay of gendered cultural hierarchies that locate pregnancy related decision making in remote authorities such as older female relatives like mother-in-laws, older female relatives etc. This might be because these women are seen as new members of the family that are not aware of the family tradition therefore, any decision concerning childbirth should be left for older women in the family who understands the tradition and belief of the family. This also show case the African culture of subordination of younger women's interest with all emphasis on whatever older females whom they believe had gone through the process of pregnancy and childbirth feel about the situation at hand. This is line with the study by Kotecha et al. (2012).

Furthermore, it was shown that fear of being noticed and attacked by evil powers, preference for Traditional Birth Attendants in early weeks of pregnancy were other factors responsible for late booking. This may be so because of the disruptive role of socio-cultural perspective in the use of public health facilities services such as antenatal and perceived threats which are often given socio-cultural interpretation increasing women's anxieties and driving them to seek multiple sources of care. In line with this study, several studies have found a consistent relationship between socio-cultural factors and late booking for antenatal. Study by Dako-Gveke et al. (2013) noted that perceived threats interpreted as socio-cultural increased women's anxiety driving them to seek multiple sources of care from herbalists, traditional birth attendants and spiritualist disrupting the continued use of skilled care providers with resultant increase in prevalence of late booking among pregnant women.

This study revealed the religious factor that has an obvious influence on pregnant women making them to book late for antenatal care was preference for prayer and faith healing. One need not wonder why it is so since there are proliferations of churches and prayer ministries in our societies today. Most Christians attend spiritual/ prayer houses that offer prayers and care during pregnancy as most Christian organizations have spiritual/ prayer houses that offer care to women especially their members that are pregnant. Another, possible explanation could be linked to the belief and fact that pregnancy is surrounded by a lot of uncertainties. Pregnant women always seek shelter from evil by running to these prayer ministries especially during the early months of their pregnancy forgetting or neglecting antenatal care. The study also reveals that advice from religious leaders/ members, engagement with religious activities were some of the religious factors that determine late booking for antenatal. Obviously, due to the trust which people normally have on their religious leaders/ members they tend to heed to their advice even when it is detrimental to their health? They will rather choose to get deeply involved with the religious activities of ministries. This might be the case with this proportion of the study population who booked late due to the advice and engagement in religious activities. This finding implies that mass media should intensify their effort in health education so as to help these religious leaders to understand that while these pregnant women come to them for prayers, they should also advise them to seek orthodox care. A study by Dairo and Owoyokun (2010) on religious factors that affect early booking supports these findings as it revealed that most Christians especially protestants attend spiritual houses for prayer at the expense of antenatal care.

The outcome of the result showed that out of the institutional/systemic factors listed, long waiting time and frequent antenatal care follow-up schedule were most significant factors. In other words, most pregnant women book late for antenatal because they do not want to waste their time or come for antenatal visit frequently. They choose to wait until second or third trimester before booking for antenatal so as to reduce the number of antenatal visits and also reduce the time they will have to wait before being attended to. This finding supports the need for the health institutions to adopt the Focus Antenatal Care approach as was recommended by the WHO in 2002. Under this approach, the WHO recommended only four antenatal visits for normal pregnancy and booking which should occur by 16 weeks gestation. Also implicated under organizational/systemic factors for late booking among pregnant women were attitude of the nurses and other staff and poor communication by healthcare providers on when to initiate antenatal care. This indicates the need for more comprehensive health education on the importance and timing of antenatal care and also the need for attitudinal change among nurses and other health care workers. Owing to the state of Nigeria today, it is obvious from this study that late booking for antenatal care is partly due to harsh economic condition as some of the pregnant women indicated that they booked late due to high cost of antenatal services. In Enugu State, antenatal care services is free in state government hospitals only for civil servants with evidence of tax payment and majority of the respondents and their spouses are not civil servants so they have to pay for the services. The outcomes of this study are in consonance with the findings of a survey by Zegeye et al. (2013) on prevalence and determinants of late antenatal care visit among pregnant women attending antenatal care in Debre, Berhan Health institutions, Central Ethiopia. Their result revealed that poverty, frequent antenatal schedule, long traveling time, long

waiting time and inadequate health facilities are factors affecting the timing of antenatal care initiation.

Conclusion

Majority of the respondents booked for antenatal at 5 months gestational age and are multigravidas. Personal/ maternal factors especially health status in present pregnancy, ignorance of the appropriate time (gestational age) to register, exposure (enough knowledge from previous pregnancies) predispose pregnant women to late booking for antenatal care. Husband's decision and preference for mother-in-law/friends/other women's advice during the early weeks of pregnancy are the socio-cultural factors that are mostly responsible for late booking for antenatal. Preference for prayer and faith healings the religious factor that mostly is responsible for late booking among pregnant women. Finally, long waiting time and frequent antenatal care follow-up schedule as institutional/systemic factors are responsible for late booking.

Recommendations

Based on the findings from this study, the researchers made the following recommendations; Health education on the timing and importance of attending antenatal care early should be done in communities where women and other people that influence the pregnant women's decision to attend care live so that they get this information even before they conceive. This can be done through the media, places of worship, schools and community gatherings; Community based health education programs are needed to correct the misconception about antenatal care; The campaign for male involvement in issues of reproductive health such as antenatal care should be sustained so that they will get to know why it is important that their wives should book early for antenatal care; promoting education, public health enlightenment, reduction in poverty and modification of certain cultural practices could be helpful in mitigating hindrances resulting from these factors, thereby contributing towards the improvement in maternal and child health; there is need for transitioning from traditional approach of ANC to Focused Antenatal Care (FANC) model recommended by WHO because some of the pregnant women booked late because of frequent antenatal care follow-up schedule; Efforts should be made to promote maternal education so as to empower women to take care of themselves during pregnancy.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Nutritional knowledge, attitude and practices among pregnant women who attend antenatal care at public hospitals of Addis Ababa, Ethiopia

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During pregnancy, maternal nutrition requires considerable attention; however, pregnant women's nutritional knowledge, attitudes, and practices are less understood. The objective of this study was to assess nutritional knowledge, attitude, and practices among pregnant women who attend antenatal care at public hospitals of Addis Ababa, Ethiopia. An institution based cross-sectional study was conducted to collect relevant data of 322 pregnant women, who attended antenatal care service in selected public hospitals in Addis Ababa, Ethiopia from April to May, 2015. Simple random sampling procedure was used to select the public hospitals and systematic sampling techniques were used to select pregnant mothers by using hospitals' registration lists. Data were coded and entered to computer using Epi data version 3.1 and exported to statistical package for social sciences (SPSS) program version 21.0 for further analysis. Multivariable logistic regression analyses were used to identify independent predictors of knowledge, attitude, and practices of pregnant women regarding nutrition. The study revealed that of the 322 pregnant women surveyed, 87(27%), 156(48.4%), and 111(34.5%) of them had knowledge, favorable attitude, and good practices of nutrition during pregnancy, respectively. There was a positive significant association between educational status of women (AOR=3.047, 95%CI (1.046 to 8.873)), family income (AOR=3.093, 95%CI (1.076 to 8.890)), attitude (AOR=4.4, 95%CI (2.315 to 8.299)), number of pregnancies (AOR=2.175, 95%CI (1.034 to 4.573)) and nutrition knowledge during pregnancy. Whereas knowledge, family income, husband education and occupation had a positive association with good practices of nutrition during pregnancy. Knowledge, attitude and practices of pregnant mothers regarding nutrition during pregnancy were low in the study area.

Key words: Knowledge, attitude, practice, nutrition; malnutrition, pregnancy, Ethiopia.

INTRODUCTION

All human beings need a balanced amount of nutrients for proper functioning of the body system. Nutrition is a fundamental pillar of human life, health and development throughout the entire lifespan (Daba et al., 2013). There are approximately 40 different nutrients that are essential for health. If any one of these is deficient in the diet, the person will not be fully healthy and able to resist the agents of disease (Collins, 2007).

Malnutrition is an umbrella term for poor nutrition, whether that is excess consumption of nutrients (overnutrition) or inadequate consumption or absorption of one or more nutrients undernutrition) while undernutrition includes being underweight for one's age, too short for one's age (stunted), dangerously thin (wasted) and deficient in vitamins and minerals (micronutrient malnutrition). Malnutrition is now a problem in both poor and rich countries. In developing countries, while widespread under nutrition and micronutrient deficiencies persist, obesity is also fast emerging as a problem (Shekar et al., 2006).

In Ethiopia, nutritional disorders are among the main causes of morbidity and mortality. The major problems are protein-energy malnutrition and micronutrient deficiencies such as vitamin A, iron, and iodine (Federal Democratic Republic of Ethiopia MoH. Health Sector Development Programme, 2010). 27% of women in Ethiopia are undernourished with a body mass index (BMI) of less than the 18.5 cutoff points; only 4% are obese with a BMI of more than 25.0. These figures put Ethiopia among sub-Saharan countries with the highest proportion of malnourished women (IYCN, 2011).

Pregnancy is a time of increased energy and nutrient needs for a woman in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy, proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of fetus without drawing on mother's own tissues to maintain her pregnancy (Subarnalata and Panda, 2006).

The poor health and nutrition of women and the lack of care that contributes to their death in pregnancy and child birth also compromises the health and survival of the infants and children (Abdella, 2010). Undernutrition has the most damaging effect on the fetus during pregnancy and in the first two years of life, and the effects of this early damage on health, brain development, intelligence, educability, and productivity are largely irreversible (Shekare et al., 2006).

The pregnant and lactating woman's diet should include a substantial increase in calories, protein, calcium, folic acid, iodine and iron. Pregnant women at particular risk for nutritional deficiencies are adolescents, underweight women, obese women, women with chronic nutritional problems, women who smoke or ingest alcohol or drugs, low income women, and women with chronic illnesses such as diabetes or anemia (Edris et al., 2005). Knowledgeable about nutrition during pregnancy was low in previous studies conducted in 2013 in East Wollega, Ethiopia (64.4%) and in 2012 in Malaysia (70%) (Daba et al., 2013; Mitra et al., 2012).

Practices of eating fresh vegetables and daily milk consumption, is low in the previous studies conducted in America (58.9 and 42.7%) respectively (Federal Democratic Republic of Ethiopia, 2013). While many studies and projects focus on maternal health in Addis Ababa, less attention is given to maternal nutrition in this study area (Berg et al., 2011). It is clear that maternal nutrition is crucial in reducing maternal and infant morbidity and mortality, but no study has been conducted to assess nutritional knowledge, attitude and practices of pregnant mothers in the study area. Therefore, the aim of this study was to assess nutritional knowledge, attitude, and practices among pregnant women who attend antenatal care at public hospitals of Addis Ababa, Ethiopia.

MATERIALS AND METHODS

The study was conducted in Addis Ababa, the capital city of Ethiopia. Established in 1887, by Emperor Menilik II, the city is divided into ten sub-cities. In 2014, Addis Ababa had a projected population of 3,194,999 million of whom 1,679,998 (53%) were females and 1,515,001 (47%) were males (Marías and Glasauer, 2014). According to the information from Ministry of Health, in Addis Ababa there are eight hospitals that provide antenatal services to the public. Based on the information provided from each of these hospitals, the average number of pregnant mothers attending antenatal clinics antenatal care (ANC) is estimated at 2527 per month. The study was conducted from April to May, 2015.

The study population included randomly selected pregnant women who had visited public hospitals in Addis Ababa during the month of April 2015 for antenatal care. The sample size was determined using single population proportion formula at 95% of confidence interval with assumption of prevalence of knowledge of pregnant mothers towards nutrition 64.4% (Daba et al., 2013) with (α=0.05) 5% marginal error (d=0.05). Since the total study population in the study area is below 10,000, reduction formulas were employed. By factoring in a 10% non-response rate, the final sample size was 340.

The calculated sample size was proportionally allocated to randomly select four public hospitals in Addis Ababa based on the number of clients attending antenatal care (ANC). To select study subjects from each antenatal care unit systematic random sampling technique was applied by using client's registration order to get ANC care during the data collection period. Then every 7th person, as they registered, was included in the study at each antenatal care unit until the desired sample size was attained.

An unstructured, semi-structured and structured questionnaire was prepared in English. The questionnaire was translated to Amharic and after data collection it was translated back to English to check for consistency by experts. Data were coded and entered to computer using Epi data version 3.1 and exported to SPSS program version 21.0 for further analysis. The result was presented using frequency tables and percentage. Bivariate analysis was done to determine association between factors and knowledge, attitude and practice among pregnant mothers. Multivariate logistic regressions were performed to identify the independent predictors of knowledge, attitude and practice among pregnant mothers.

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Data were supervised by BSc midwives who were trained on the objective of the study, methods of data collection, and content of questionnaire in order to avoid any ambiguity raised during data collection. Data was checked for completeness, accuracy, and consistency by supervisors and principal investigator after the data collection on daily base. The prepared questionnaire was pre-tested on 5 % of pregnant mothers who were not being included in the study to identify the clarity and sequence of question.

Operational definitions

Knowledge

This refers to an individual's knowledge of nutrition, including the ability to remember and recall food and nutrition related terminology.

Knowledgeable

If respondents score ≥ 70% (out of 100%) on the knowledge questions.

Not knowledgeable

If respondents score < 70% (out of 100%) on the knowledge questions.

Attitudes

Pregnant women's feeding or eating behavior which is influenced by her emotions, motivations, perceptions and thoughts.

Favorable attitude

The respondents attitude score > median

Unfavorable attitude

The respondents 'attitude score less than or equal to the median.

Practice

This is the observable action of the mothers that could affect her nutrition such as eating, feeding, cooking and selecting of foods.

Good practices

This is when the pregnant mothers include fruits, vegetables, meat, milk and milk products in their diet at least once per day, and for frequency of four or more meals per day.

Poor practices

This is when the pregnant mothers did not practice food recommendation for pregnant women and for frequencies, less than once per day regarding fruits, vegetables, meat, milk, and milk products and meal frequency less than three times per day.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board of Addis Ababa University. Communication with different hospital administrators were made through formal letter obtained from Addis Ababa University. After the purpose and objective of the study have been informed, written and verbal consent was obtained from each study participant. Participants were informed that participation was on voluntary basis and they can withdraw from the study at any time if they were not comfortable about the questionnaire. In order to keep confidentiality, the information was maintained throughout by excluding names as identification in the questionnaire and kept their privacy during the observation by observing them alone.

RESULTS

A total of 322 pregnant mothers participated in the study, with 94.7% response rate. The mean age (0±SD) of the participants was 28.44 (0±4.199) years, while age range was 18 to 42. About 75% of the respondents were in the age range of 25 to 34 years (Table 1). From the participants, 27% had good knowledge about maternal nutrition during pregnancy (Figure 1). Regarding attitude of mothers about nutrition during pregnancy, 156 (48.4%) had favorable attitude. The highest positive attitude score were for preparing meals with iron-rich foods (91%) followed by preparing meals with iodized salt (90.7%) (Figure 2). Concerning micronutrient supply, 204 (63.4%) of women had iron tablets and took them correctly, but only 25 (7.8%) of women had folic acid supplies at three months before pregnancy and within three months after conception. In general, 34.5% of the pregnant mothers reported good practices regarding antenatal nutrition (Figure 3).

Factors associated with maternal nutrition knowledge during pregnancy in Addis Ababa public hospitals

The factors associated with nutritional knowledge during pregnancy include educational status of the women, family income, attitude and number of pregnancies (Table 2).

Factors associated with maternal nutrition attitude during pregnancy in Addis Ababa public hospitals

Knowledge was another factor associated with favorable nutritional attitudes during pregnancy (Table 3).

Factors associated maternal nutrition practice during pregnancy in Addis Ababa public hospitals

The husband's education, occupation, monthly income and knowledge were additional factors associated with nutrition practice during pregnancy (Table 4).

DISCUSSION

This study was conducted to investigate the level of

Table 1. Socio-demographic characteristics of pregnant mothers attending ANC (N=322).

Variable	Number	Percentage (%)	
		Yes (%)	No (%)
Age	15-24	50 (15.5)	-
	25-34	244 (75.5)	-
	35-44	28 (8.7)	-
Marital status	Single	6 (1.9)	-
	Married	307(95.3)	-
	Divorced	1 (0.3)	-
	Widowed	3 (0.9)	-
	Separated	5 (1.6)	-
Religion	Orthodox Tewahido	210 (65.2)	-
	Muslim	73 (22.7)	-
	Protestant	36 (11.2)	-
	Catholic	1 (0.3)	-
	Others	2 (0.6)	-
Ethnicity	Amhara	128 (39.8)	-
	Tigrie	22 (6.8)	-
	Oromo	76 (23.6)	-
	Gurage	64 (19.9)	-
	Others	32 (9.9)	-
Family size	One	3 (0.9)	-
	Two	-	-
	Three	26 (8.1)	296 (91.9)
Others	Using salt to cook the main meal	238 (73.9)	84 (26.1)
	Habit of eating fresh citrus fruits/juice	77 (23.9)	245 (76.1)
	Habit of taking coffee or tea	61 (18.9)	261 (81.1)
	Iron supply	204 (63.4)	118 (36.6)
	Folic acid supply	25 (7.8)	297 (92.2)
	Frequency of meal per day	211 (65.5)	111 (34.5)
	Habit of taking snacks between meals	219 (68.0)	103 (32.0)
	Habit of eating carbohydrates b/n meals	204 (63.4)	118 (36.6)
	Eating protein daily	303 (94.1)	19 (5.9)
	Habit of eating fresh vegetables	87 (27.0)	235 (73.0)
	Drinking milk	101 (31.4)	221(68.6)
	Eating milk products	57 (17.7)	265 (82.3)
	Eating meat	21 (6.5)	301 (93.5)
	Following weight	259 (80.4)	63 (19.6)

nutritional knowledge, attitudes, and dietary practices of pregnant women during pregnancy and associated factors in Addis Ababa, Ethiopia. Based on this study, 27% of the mothers had knowledge about nutrition during pregnancy, which is lower than previous studies conducted in 2013 in East Wollega, Ethiopia which is 64.4%, and in 2012 in Malaysia it was 70% (Daba et al., 2013; Mitra et al., 2012). As the result showed there is a knowledge gap about nutrition during pregnancy among pregnant mothers in Addis Ababa. The difference might be due to sociodemographic differences and low attention for counseling about nutrition during pregnancy by considering the mothers as knowledgeable on it since the mothers are from capital city of Ethiopia.

In this study, the mothers' knowledge regarding the importance of milk and its products, protein, iron, source of vitamins, calcium and iron were 87(27%),86 (26.7%), 149 (49.4%), 171 (53.1%), 75 (23.3%) and 54 (16.8%)

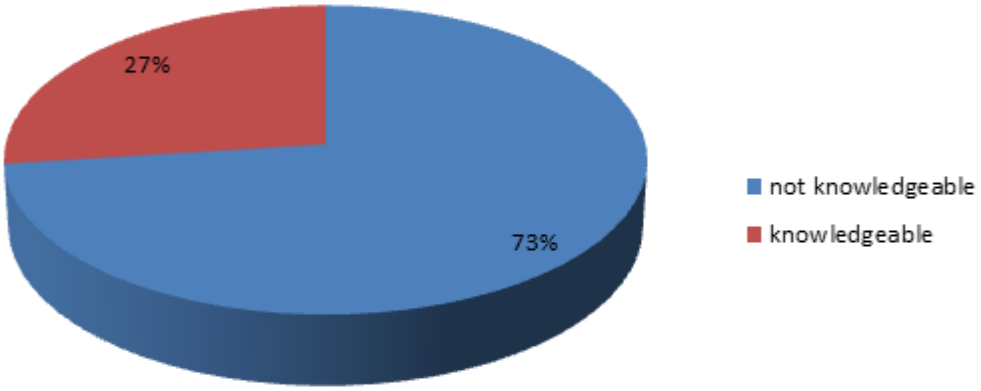

Figure 1. Knowledge of pregnant mothers towards nutrition during pregnancy in Addis Ababa public hospitals, 2015.

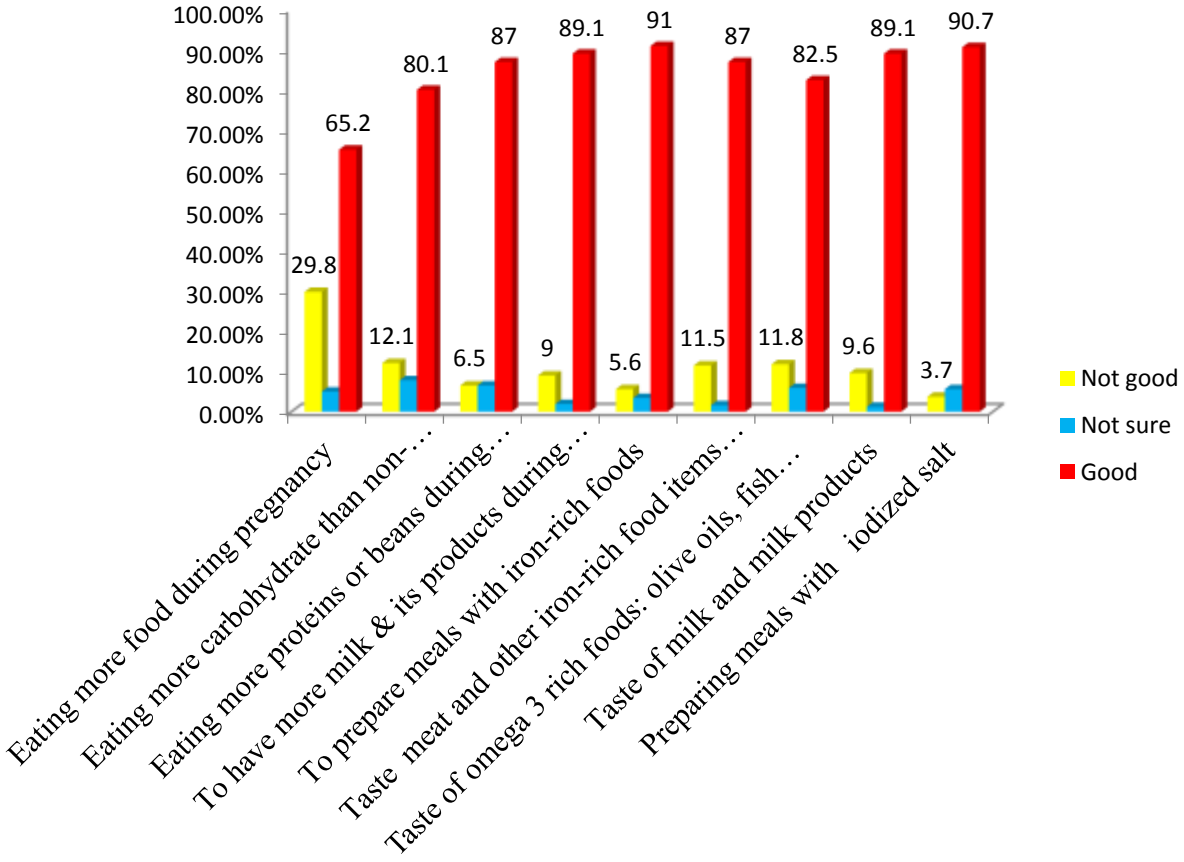

Figure 2. Attitude of mothers to wards nutrition during pregnancy in Addis Ababa, public hospitals, 2015

respectively. Which is lower than the study conducted in Ethiopia at district level (78.2, 68.5, 57.3, 62.9, 71.8 and 61.3% respectively) (Federal Democratic Republic of Ethiopia, 2013)**.** The difference might be due to residence differences and giving attention for other milk substituting products, since they have different options. This study also revealed 147(45.7%) and 114 (35.4%) of pregnant mothers had knowledge about the danger of malnutrition on the mother and her fetus, respectively. This is similar with the study in East Wollega, which is 34.8% (Daba et al., 2013). Most of the pregnant mothers (280 (87%)) thought that eating more protein or beans during

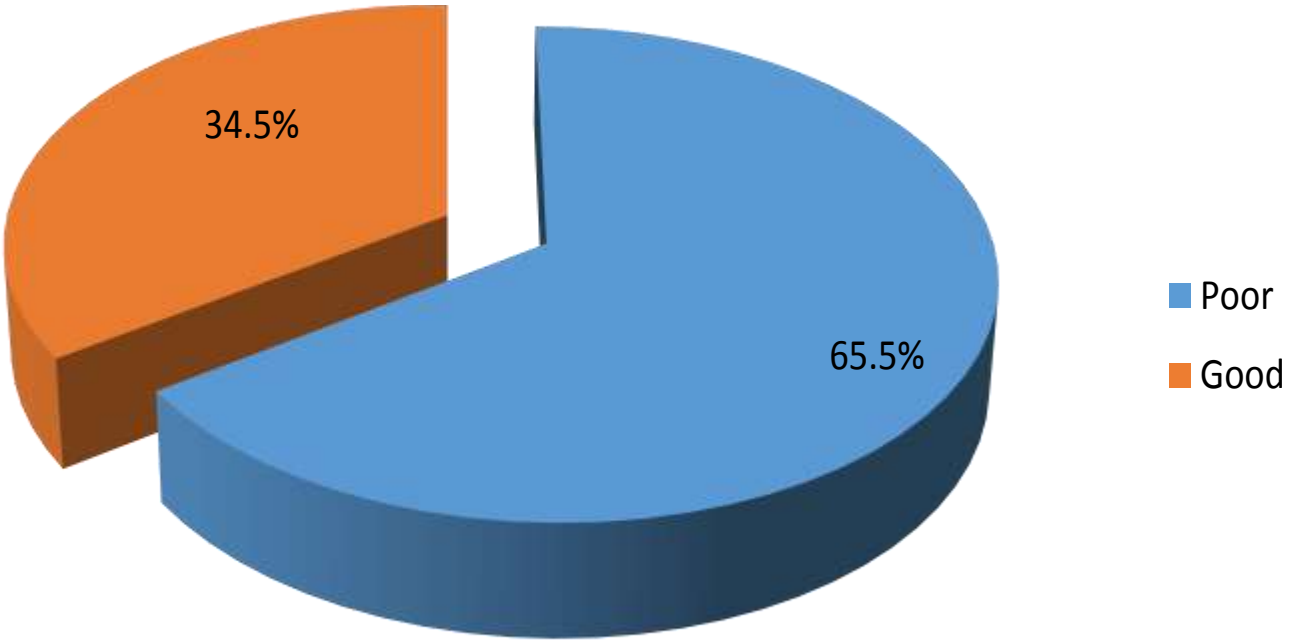

Figure 3. Nutrition practice level of pregnant mothers in Addis Ababa, public hospitals, 2015

Table 2. Factors associated with nutritional knowledge of pregnant mothers (N=322).

Variable		Knowledge		95% CI	
		Yes (%)	No (%)	COR	AOR
Education	Diploma and above	55 (53.4)	48 (46.6)	19.5 (7.842-48.384)***	8.054 (2.843-26.130)**
	Secondary school	26 (23.4)	85 (76.6)	5.2 (2.045-13.222)**	3.047 (1.046-8.873)*
	Primary and no formal education	6 (5.6)	102 (94.4)	1	1
Husband education	Diploma and above	49 (48.5)	52 (51.5)	7.4 (3.464-15.996)***	1.276 (0.452-3.604)
	Secondary school	28(21.2)	104 (78.8)	2.1 (0.976-4.635)	1.015 (0.384-2.682)
	Primary and no formal education	10(11.2)	79 (88.8)	1	1
Occupation	Employee	28 (51.9)	26 (48.1)	4.2 (2.228-7.927)***	0.889 (0.378-2.094)
	Private business	1 8(26.9)	49 (73.1)	1.4 (0.756-2.719)	0.46 (0.200-1.040)
	House wives	41(20.4)	160 (79.6)	1	1
Monthly average income	> 3500	54(46.6)	62 (53.4)	13.4 (5.414-32.941)***	5.95 (2.025-17.480)**
	2000-3500	27(25.0)	81 (75.0)	5.1 (2.009-13.002)**	3.093 (1.076-8.890)**
	< 2000	6(6.1)	92 (93.9)	1	1
Obstetric score	Multigravida	71 (29.8)	167 (70.2)	1.807 (0.980-3.330)	2.175 (1.034-4.573)*
	Primigravida	16 (19.0)	68 (81.0)	1	1
Associated diseases	Yes	15 (41.7)	21 (58.3)	2.1 (1.039-4.337)*	0.655 (0.276-1.554)
	No	72 (25.2)	214 (74.8)	1	1
Attitude	Positive	67 (42.9)	89 (57.1)	5.496 (3.124-9.666)***	4.4 (2.315-8.299)***
	Negative	20 (12.0)	146 (88.0)	1	1

***= p<0.001, ** = p<0.01, *=p<0.05, COR= Crude odds ratio, AOR= Adjusted odds ratio.

Table 3. Factors associated with nutritional practices of pregnant mothers (N=322).

Variable		Attitudes		95% CI	
		Positive (%)	Negative	COR	AOR
Education	Diploma and above	68 (66.0)	35 (34.0)	3.437 (1.952-6.054)***	0.826 (0.275-2.482)
	Secondary school	49 (44.1)	62 (55.9)	1.398 (0.813-2.406)	0.721 (0.320-1.621)
	Primary and no formal education	39 (36.1)	69 (63.9)	1	1
Husband education	Diploma and above	62 (61.4)	39 (38.6)	3.289 (1.810-5.978)***	1.572 (0.529-4.671)
	Secondary school	65 (49.2)	67 (50.8)	2.007 (1.147-3.512)*	1.994 (0.943-4.215)
	Primary and no formal education	29 (32.6)	60 (67.4)	1	1
Occupation	Employee	34 (63.0)	20 (37.0)	2.139 (1.153-3.971)*	1.569 (0.421-3.452
	Private business	33 (49.3)	3 4(50.7)	1.221 (0.702-2.125)	0.681 (0.296-1.569)
	House wives	89 (44.3)	112 (56)	1	1
Monthly average income	> 3500	68 (58.6)	48 (41.4)	2.667 (1.529-4.651)**	2.237 (0.905-5.530)
	2000-3500	54 (50.0)	54 (50.0)	1.882 (1.074-3.300)*	0.975 (0.447-2.127)
	< 2000	34 (34.7)	64 (65.3)	1	1
Previous delivery	Abnormal	57 (60.0)	38 (40.0)	1.825 (1.070-3.113)*	1.184 (0.630-2.225)
	Normal	60 (45.1)	73 (54.9)	1	1
Knowledge	Knowledgeable	67 (77.0)	20 (23.0)	5.496 (3.124-9.666)***	5.5 (2.411-12.650)***
	Not knowledgeable	89 (37.9)	146 (62.1)	1	1

***= p<0.001, ** = p<0.01, *=p<0.05, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio.

Table 4. Factors associated with nutritional practices of pregnant mothers (N=322).

Variable		Practices		95% CI	
		Good (%)	Poor (%)	COR	AOR
Age	35-44	12 (42.9)	16 (57.1)	4.607 (1.542-13.767)**	0.639 (0.121-3.377)
	25-34	92 (37.7)	152 (62.3)	3.718 (1.606-8.610)**	0.901 (0.225-3.619)
	15-24	7 (14.0)	4 3(86.0)	1	1
Education	Diploma and above	58 (56.3)	45 (64.0)	9.419 (4.686-18.934)**	1.202 (0.308-4.695)
	Secondary school	40 (36.0)	71 (64.0)	4.117 (2.050-8.267)**	1.837 (0.598-5.643)
	Primary and no formal education	13(12.0)	95(88.0)	1	1
Husband education	Diploma and above	64 (63.4)	37 (36.6)	7.892 (4.015-15.511)***	6.375 (1.798-22.605)**
	Secondary school	31 (23.5)	101 (76.5)	1.400 (0.714-2.748)	1.905(0.661-5.491)
	Primary and no formal education	16 (18.0)	73 (82.0)	1	1
Occupation	Employee	28 (51.9)	26 (48.1)	3.341 (1.791-6.231)***	1.522 (0.505-4.581)
	Private business	34 (50.7)	33 (49.3)	3.196 (1.795-5.692)***	1.229 (0.491-3.074)
	House wives	49 (24.4)	152 (75.6)	1	1
Husband occupation	Employee	41 (49.4)	42 (50.6)	2.357 (1.412-3.935)**	2.896 (1.256-6.675)*
	Not employee	70 (29.3)	169 (70.7)	1	1
Monthly average income	> 3500	70 (60.3)	46 (39.7)	13.391 (6.310-28.419)***	3.073 (1.010-9.350)*

Table 3. Cond.

	2000-3500	31 (28.7)	77 (71.3)	3.543 (1.631-7.695)**	1.459 (0.501-4.249)
	< 2000	10 (10.2)	88 (89.8)	1	1
Previous delivery	Abnormal	45 (47.4)	50 (52.6)	2.425 (1.392-4.226)**	1.632 (0.776-3.432)
	Normal	36 (27.1)	97 (72.9)	1	1
Knowledge	Knowledgeable	55 (63.2)	32 (36.8)	5.494 (3.237-9.325)***	2.675 (1.138-6.288)*
	Not knowledgeable	56 (23.8)	179 (76.2)	1	1
Attitude	Positive	69 (44.2%)	87 (55.8%)	2.342 (3.237-9.325)***	1.577(0.728-3.414)
	Negative	42 (25.3%)	124 (74.7%)	1	1

***= p<0.001, ** = p<0.01, *=p<0.05, COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio.

pregnancy is good for their pregnancy. This study also revealed that 87 (27%) and 101(31.4%) of pregnant mothers reported practices of eating fresh vegetables and daily milk consumption respectively.

The practice is lower than the study conducted in America (58.9 and 42.7%) respectively (Federal Democratic Republic of Ethiopia, 2013)**.** Therefore, Addis Ababa pregnant mothers needs to improve utilization of fresh vegetables and milk consumption. The difference might be due to cultural, socio economic differences and access to nutritious food. Of the mothers surveyed, 209 (65%) reported having four or more meals per day. More than 219 (68%) of the respondents reported eating snacks between meals. This means the remaining 32% of the mothers do not have good meal practice based on the recommended meal practice.

204 (63.4%) reported eating more carbohydrates between meals during their pregnancy, which was higher than the study conducted in East Wollega (33.9%) (Berg et al., 2011)**.** This study uncovered that, 303(94.1%) of the pregnant mothers had the habit of eating either plant or animal protein daily. This finding was greater than the study conducted in Ethiopia at district level (42.7%) (Federal Democratic Republic of Ethiopia, 2013). The difference may be accessibility of variety of foods in cities than districts. Majority of the mothers in this study, 204 (63.4%) had a good iron supply during pregnancy, which is similar with the study conducted in Western Kenya (62%) (Perumal et al., 2013). This study revealed that, 111(34.5%) of the pregnant mothers had good nutritional practices, which is similar to the study conducted in the East Wollega (Berg et al., 2011).

Conclusion

Most pregnant women in this study reported poor level of knowledge and practices about nutrition and balanced diet during pregnancy. Monthly income, educational level and attitude were the significant factors affecting nutritional knowledge of mothers during pregnancy. Monthly income, husband education and occupation were significant predicting factors for nutritional practices during pregnancy. Good knowledge about maternal nutrition usually affects nutritional attitudes during pregnancy.

Recommendation

Since pregnant women in this study reported poor knowledge and nutritional practices during pregnancy, health care providers should introduce strategies for providing health education about proper and balanced maternal nutrition during ANC visits.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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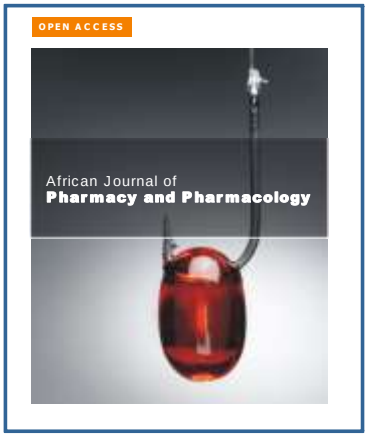

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